Chapter Two

Information Systems Development Project

2.1. Managing information system project

Managers do not generate a useful product of their own. Instead, they provide and coordinate resources so that others can generate useful products. Managing a software project requires a combination of managerial and social skills to foresee potentially damaging problems and to implement the appropriate response. Managers do not make technical decisions and often do not have the background to make such decisions. Instead, they are responsible for coordinating and administrating the project and ensuring that the high-quality system is delivered on time and within budget. The main tools of management are planning, monitoring, risk management, and contingency handling.

The starting point for a project is called a system request, which is a formal way of asking for IT support and these projects aimed at providing improved service, better performance, more information and stronger controls with reduced cost.

Project management: - is the process of planning, organizing, leading and controlling the development of an information system. It is important throughout the process especially during implementation. The goal of project management is to deliver an information system that is acceptable to users and that is developed on time with budget. Project management is concerned with planning and allocating resources to ensure the delivery of quality software system on time and within budget. Project management is subject to the same barriers as technical activities: complexity and change.

Project management ensures the delivery of a quality system on time and within budget. The main components of this definition are **quality**, **time**, and **money**. Ensuring delivery within budget requires a manager to estimate and assign the resources required by the project in terms of participants, training, and tools. Ensuring on-time delivery requires a manager to plan work effort and to monitor the status of the project in terms of tasks and work products. Finally, ensuring quality requires a project manager to provide problem reporting mechanisms and monitor the status the product in terms of defects and risks. All **three aspects** of the project, quality, budget, and time, are essential and need to be addressed together for the project to succeed.

A project must have a leader. The project manager usually is a senior system analyst or an IT department manager if the project is large but for small projects an analyst or a programmer possibly will manage it. For larger projects we may perhaps need project coordinator who handles administrative responsibilities for the development team and negotiates with users who might have conflicting requirements or want changes that would require additional time or expanse.

The basic management functions and also the activities associated with these functions apply to all types of managers, including IT project managers. A project manager's planning includes identifying and planning project tasks and estimating completion times and costs. The organizing function consists of staffing, which includes selecting the project team and assigning specific tasks to team members. Organizing also requires structuring and scheduling the project work. Leading involves guiding, supervising the team's workload. Finally, controlling activities include monitoring the progress of the project, evaluating results, and taking corrective action when necessary to stay on target.

2.2. Information system project phase

So far in the course we have been discussing basic concepts of managing system projects and the system development environment which includes participants, methodologies and phases involved. We have now got to take a closer look at the project identification, selection, initiation and planning phase of the systems development. At these phases, major activities to be conducted are:

- ❖ Need (identification) Assessment,
- ❖ Selection of a project,
- ❖ Project initiation,
- ❖ Detailed study,
- ❖ Feasibility study, and
- ❖ Project planning

2.2.1. Project Identification

Need Identification or Assessment which is focusing on different sources and forms of projects request, checking the validity of requests through request clarification is an important task. Possible sources of request with their own reasons are: -

- ➢ Manger: - Managers within the organization should also be consulted about the system.
- ➢ User: - are persons who interact with the system when it is completed.
- ➢ System analyst (formal planning team) or Technical staff: - Members of the company's information system (IS) department, consisting of systems analysts and designers and programs, need to be involved.

It is also important to check that requests are not due to negative competition or simply due to the desire for a change. This is what we call checking the validity or logicality of the requests.

2.2.2. Selection

Next to identifying the possible area for system development selection of a project that do need immediate attention by considering its link with the major objective of the institution and other issues is another point to consider.

2.2.3. Project Initiation

It is time now to create some initiation including forming a team, and establishing management relationship and formal communication with customers. This is just to let everybody in the institution responsive to the effort efferent of developing an information system.

2.2.4. Conducting detailed study

It is about collecting facts and information about the existing system using fact finding methods (traditional and modern). At this stage every piece of information about an organization, workers and even the work itself will be collected and the information should be documented in a form of file.

2.2.5. Conducting a Feasibility Study

Assessing feasibility means answering questions relating to the utility and viability of the system that is going to be developed. This means answering the following questions:

- Is it really cost-beneficial to develop the proposed system?
- Is it possible to develop the proposed system? …

In order to answer these questions we conduct various kinds of feasibility analyses like economic, technical, operational, schedule, legal and political feasibility, which we are going to see in the next chapters.

2.2.6. Planning for the IS Development Project

Two important things should be understood about planning: first that it is essential for a project's success and, second, that it should be undertaken as early as possible. A plan should be seen as a map setting out the route to be followed. The thing to remember is that the plan is not the project; it is only a model of the project. It is created so that the project manager can use it to check progress and adjust the work to changing circumstances.

What will a good plan look like, and what will it contain?

First, a good plan must be a flexible, revisable document. We have already said that any plan can only be regarded as a model, and will have to be modified and revised as the project progresses. So it makes sense to develop a structure that will allow for this revision rather than constrain it. From this it follows that we shall not want to treat the whole project as one huge task. Rather, we shall want to break it down into more manageable sub-tasks that we can modify more easily.

There is another reason for this breakdown; when we come on to estimating later in this chapter, it will be clear that much more accurate estimates can be produced for small tasks than for large ones. Alternative methods of achieving this project breakdown are considered in the next section. Apart from breakdown of the work involved, a plan will also contain:

- A description of the organization of the project, showing who the personnel are and their roles and responsibilities;
- Descriptions of the products to be produced, with their completion and quality criteria;
- Descriptions of the individual work packages for team members;
- An analysis of the interdependence of the various tasks, expressed perhaps as a network diagram;
- An analysis of the risks involved in the project, with the possible countermeasures for each risk.

2.3. Representing and scheduling project plans

A project manager has a wide variety of techniques available for representing and documenting project plans. These planning documents can take the form of graphical or textual reports although graphical reports have become most popular for depicting project plans. A Gantt chart is a graphical representation of a project that shows each tack activity as a horizontal bar whose length is proportional to its time for completion. Different colors, shades, or shapes can be used to highlight different kinds of tasks. Gantt charts do not show how tasks must be ordered (precedence), but simply show when an activity should begin and when it should end. Consequently, they are often more useful for depicting relatively simple projects or subparts of a larger project, the activities of a single worker, and for monitoring the process of activities compared to scheduled completion date.

A PERT (Program Evaluation Review Techniques) chart is a graphical depiction of project task activities and their inter-relationship. As with a Gantt chart, different types of tasks can be highlighted by different features on the PERT chart. The distinguishing feature of PERT is that the ordering of activities is shown by connecting an activity with its predecessor and successor activities. However, the relative size of a node (nodes represent an activity), or arcs (arrow) does not imply the activity's duration.

2.3.1. Representing project plans

Project scheduling and management require that time, cost, and resources be controlled. Resources are any person, group of people, piece of equipment, or material used in accomplishing an activity and PERT is a critical and PERT is a critical path scheduling technique used for controlling resources. A critical path refers to a sequence of activities whose order and durations directly affect the completion date of a project. Of the many project scheduling methods, PERT is one of the most widely used and requires that a project have

- Well-defined activities that have a clear beginning and end point
- Activities that can be worked on independently of other activities
- Activities that are ordered
- Activities that when completed serve the purpose of the project

A major strength of the PERT techniques is its ability to represent completion time variability. So they are used where variability in the duration of activities is a norm. Gantt charts are also used to represent project plans for simple projects or parts of large projects. They show the start and completion dates for individual tasks.

2.3.2. Calculating Expected time duration using PERT, Gantt chart and Network diagram

A schedule is the mapping of tasks onto time. Each task is assigned planned start and end times. This allows us to plan the deadlines for individual deliverables. The most often used diagrammatic notations for schedules are PERT, Gantt charts and Network diagram.

Planning requires definition of the scope and identification of tasks, their sequence and duration. After doing this it is just using a tool to represent it in a form of schedule and here we will see the stapes we follow while planning projects.

A. Defining Scope of the IS Development Project plan

Scope defines the boundaries of a project-What part of the business is to be studied, analyzed, designed, implemented and improved? Accordingly, it should answer the following basic questions:

- **Problem statement**- what problem exactly are you trying to solve?
- **Project objectives**-what product would solve the problem, would the users want and you are planning to build?
- **Project description**- what activities will the project involve?
- **Project benefits**- what are the benefits of the IS if developed?
- **Time**- how much time would the project take?

All these have to be negotiated with users and managers to arrive at a common understanding of the scope of the IS development project.

B. Identification of tasks through decomposition (phases, activity, task)

Once we have defined the scope of the project, we can identify the tasks- work to be done- in the project. Usually, analysts use a top down work breakdown approach to identify the tasks.

For instance consider the following work breakdown structure you can use to enter tasks in Microsoft Project:

1. Project Initiation and Planning
    1.1. Feasibility Study
        1.1.1. Determining economic feasibility
        1.1.2. Determining operational feasibility
        1.1.3. Determining technical feasibility
    1.2. Project planning
        1.2.1. Defining the scope of the project
        1.2.2. Identifying tasks in the project
2. Analysis
    2.1. Determining User requirements

C. Estimating Task Duration

The next step in planning for the IS development project is estimating the time required to carry out each task identified above. Time estimates for tasks have to take in to account such factors as:

⇒ Efficiency of the project team members, Possible interruptions, Size of the project team, Availability of users, Complexity of the business function to be analyzed and Experience of team members and so forth.

Usually an average of the optimistic, pessimistic and expected time estimates is taken to arrive at the most likely time duration of a task.

- **Optimistic duration (OD)** - the minimum amount of time it would take to perform the task if everything goes well.
- **Pessimistic duration (PD)** - the maximum amount of time it would take to perform the task if all things go wrong.
- **Expected duration (ED)** - the amount of time needed to perform the task under normal circumstances.

Usually more weight (4 times) is given to the expected duration when computing the average of the three estimates to arrive at the most likely duration (D) of the project tasks while giving 1 for others.

Consider the following example: - A project team determines that it would take 4 days to conduct technical feasibility assessment if no member of the project team takes leave, no member is absent or sick, no member will be interrupted by a phone call and so forth and every one works effectively 8 hours a day nonstop.

They also determine that it would take 10 days if all possible problems such as members of the team being absent, users are busy with a meeting to supply data for the assessment, and so forth.

However, the team has the experience of usually conducting technical feasibility assessments in 6 days in other projects taking in to account.

What is the most likely duration of the time needed to conduct technical feasibility assessment for this project?

$$D = \frac{OD + 4*ED + PD}{6}$$

In this case, $D = \frac{4 + (4*6) + 10}{6} = 6.33 \text{ weeks}$

D. Identification of task sequences

Before preparing the time Schedule using planning tools it is necessary again to identify sequence of tasks especially in the case of PERT chart for scheduling. And what we should consider here is the input/out puts of every task.

E. Preparing the Time Schedule Using Planning Tools

Once we have a list of the tasks to be carried out in the project, sequence and the duration they take we can use either Gantt charts or PERT (program evaluation and review technique) charts to graphical present the time schedule for the project.

PERT Chart

It is called a bottom up techniques that analyze a large complex project as a serious of individual tasks, called Project tasks. A PERT chart represents a schedule as a cyclic graph of tasks. The planned start and duration of the tasks are used to compute the critical path, which represents the shortest possible path through the graph. The length of the critical path corresponds to the shortest possible schedule, assuming sufficient resources to accomplish in parallel tasks that are independent. Moreover, tasks on the critical path are the most important, as a delay in any of these tasks will result in a delay in the overall project. The tasks and bars represented in thicker lines belong to the critical path.

To prepare a PERT chart:-

- Identify all the project tasks & estimate how much time each task will take to perform.
- We must determine the logical order in which the task must be performed.
- Identify if different tasks performed at the same time or if they are performed respectively.

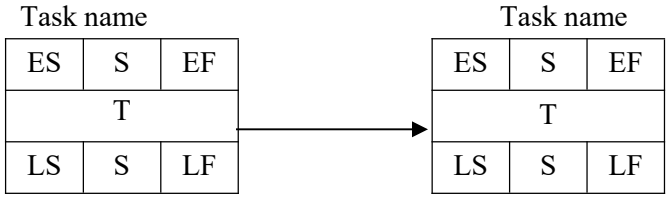
In a PERT analysis chart project tasks are shown as rectangular boxes called task box and are arranged in the sequence in which they must be performed. The task box contains important information about the task and it has five sections containing Duration, Early Start, Early Finish, Late Start and Late Finished.

Terms and concepts

A. T (task duration, or time):- is the expected or predicted duration of tasks and all tasks must use the same time unit. Every project starts at Zero (0) time, because no preceding events exist.
B. ES (early start):- is the earliest time that a task can begin.
C. EF (early finish):- is the earliest time that a task can be completed. To calculate EF, you need to add the task duration (T) to the ES for that task. It is important to understand that the EF for the final task is the expected project duration for the whole project.
D. LF (late finish):- is the latest time that a task can be completed without delaying the overall project.
E. LS (late start):- is the latest time that a task can begin without delaying the overall project.
F. ⟶ : - Shows logical flow of dependent tasks.
G. S (slack):- is the time that a task could be late with out having an impact on the overall project. It is the difference between EF and LF or LS and ES.

Note: - when you use PERT, you first calculate the ES and EF for all tasks, which is working from left to right across the diagram until the final task is reached.

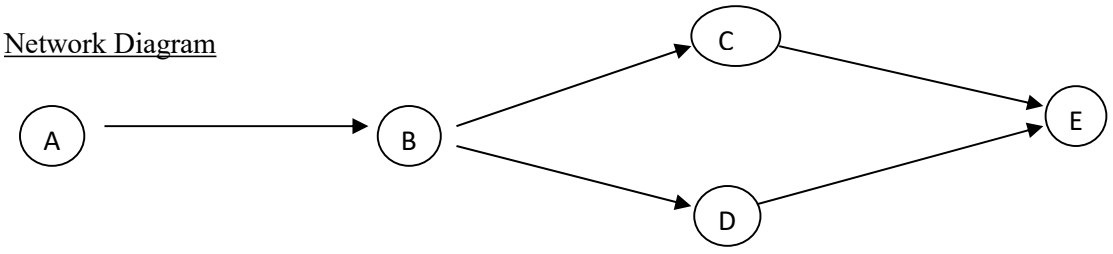
Task box format:-



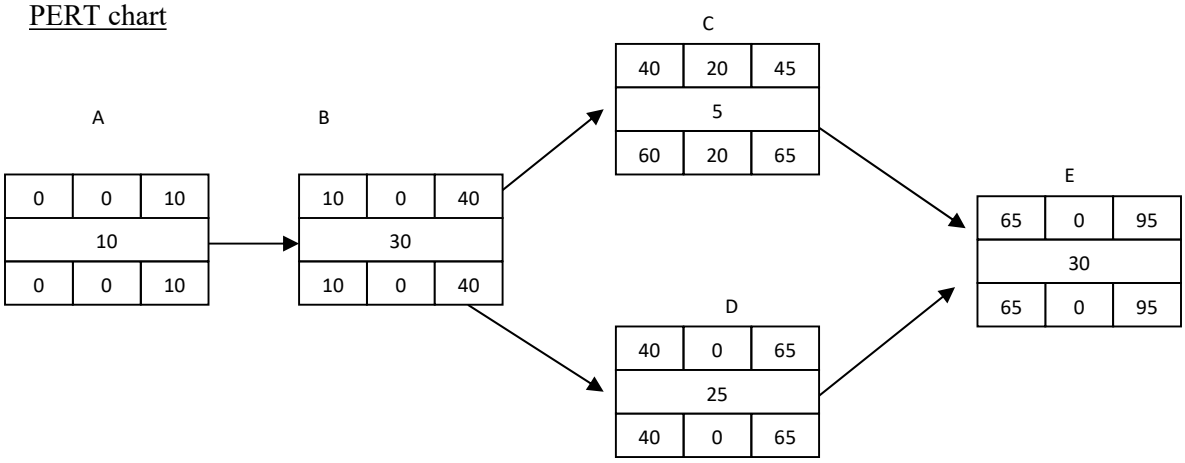
Example 1: - There are five tasks in a project. Task A and B are sequential tasks. Task B has multiple successor tasks, and task E has multiple predecessors and the project duration is 95 days.

Task		Duration
A.	Obtain Authorization	= 10
B.	Hire system Analyst	= 30
C.	Plan Training	= 5
D.	Conduct Interviews	= 25
E.	Announce Training	= 30

Network Diagram



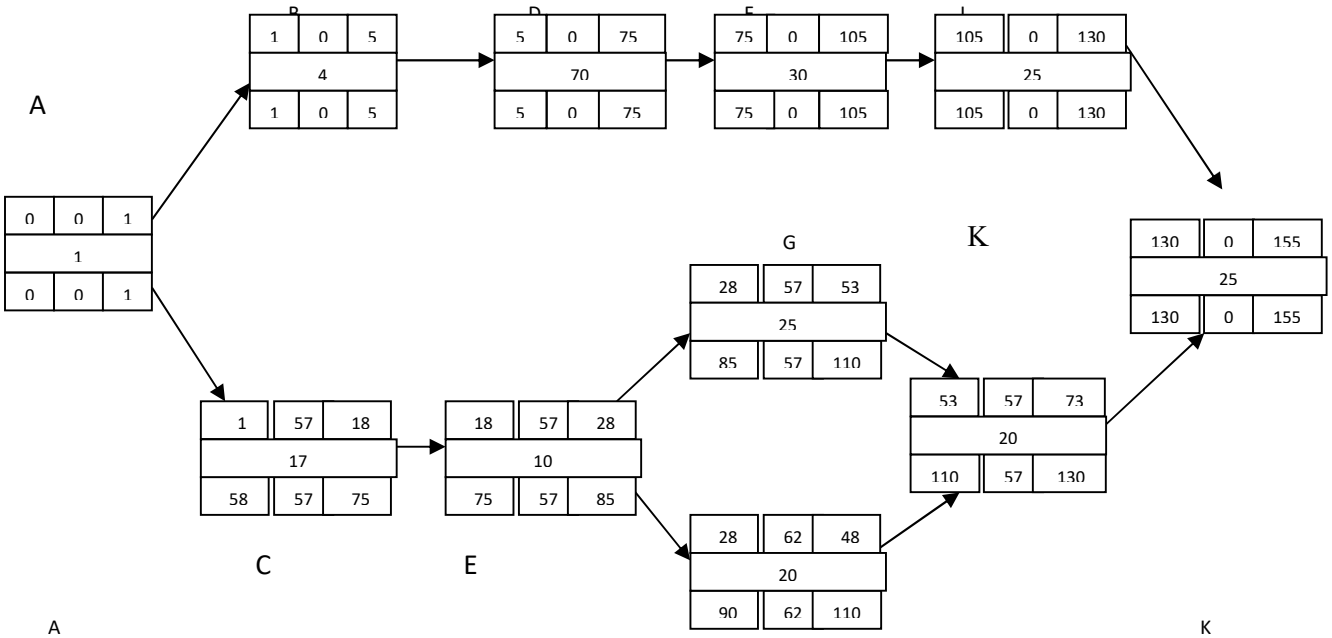
PERT chart



Example 2: -

Task	Description	Duration (Days)	Predecessor tasks
A	Develop plan	1	-
B	Assign Tasks	4	A
C	Obtain Hardware	17	A
D	Programming	70	B
E	Install hardware	10	C
F	Program test	30	D
G	Write user manual	25	E
H	Convert files	20	E
I	System test	25	F
J	User training	20	G, H
K	User test	25	I, J

Based on the above table construct PERT chart and determine critical path.



The critical path is the sequence of tasks with no slack time – ES and LS are identical, and EF and LF are identical (tasks A-B-D-F-I-K are critical paths).

GANTT CHART

A Gantt chart is simple horizontal bar chart that shows series project tasks against a calendar. Each bar represents a named project task. It displays time on the horizontal axis and arranges the activities vertically, from the top to bottom, in the order of there start dates. The length of the bar indicates its duration. Medium size project have less tasks compared to large projects.

Gant charts offer the following advantages:

- They are easy to learn, prepare and use
- They show overlapping tasks that can be performed at the same time
- The bars in a Gantt chart can be shaded to clearly indicate percentage completion and project progress.

Example: - use the above example 1 in PERT Analysis section to determine Gantt chart.

	Weeks						
Tasks	Jan1-15	Jan16-31	Feb 1-15	Feb16-28	Mar1-15	Mar16-31	Apr1-15
A							
B							
C							
D							
E							

Comparing Gantt and PERT

- Gantt
  - Visually shows duration of tasks
  - Visually shows time overlap between tasks
  - Visually shows slack time
- PERT
  - Visually shows dependencies between tasks
  - Visually shows which tasks can be done in parallel
  - Shows slack time by data in rectangles

F. Preparing and Communicating a Project Plan Document

At the end of the planning phase a summary of the activities conducted during the planning phase and the results obtained will be prepared in a project planning document called Base line project plan (BPP). It is a document which contains all the necessary information about the project like, the scope, the team formed and the schedule. This has to be communicated with all stakeholders and agreed upon before moving on to the next phase-analysis

2.4. Using project management software

A wide variety of automated project management tools are available to help you manage a development project and new versions of those tools are continuously being developed and released by software

venders. Most of the available tools have a common set of features that include the ability to define and order tasks, assign resources to tasks, and easily modify tasks and resources.

Project management software can assist you in project planning, estimating, scheduling, monitoring and reporting. Powerful project management packages offer many features, including PERT/CPM, Gantt charts, resource scheduling, project calendars, cost tracking and cost-benefit analysis. The analyst can select output in the form of printed reports, screen displays, or graphical plots.

One particular project management system that has had consistent high marks in computer publication reviews is Microsoft Project for Windows. And the other popular soft ware is Microsoft Visio. When using this system to manage a project, you need to perform at least the following activities.

- Establish project start or end date
- Enter tasks and assign task relationships
- Select scheduling method to review project reports